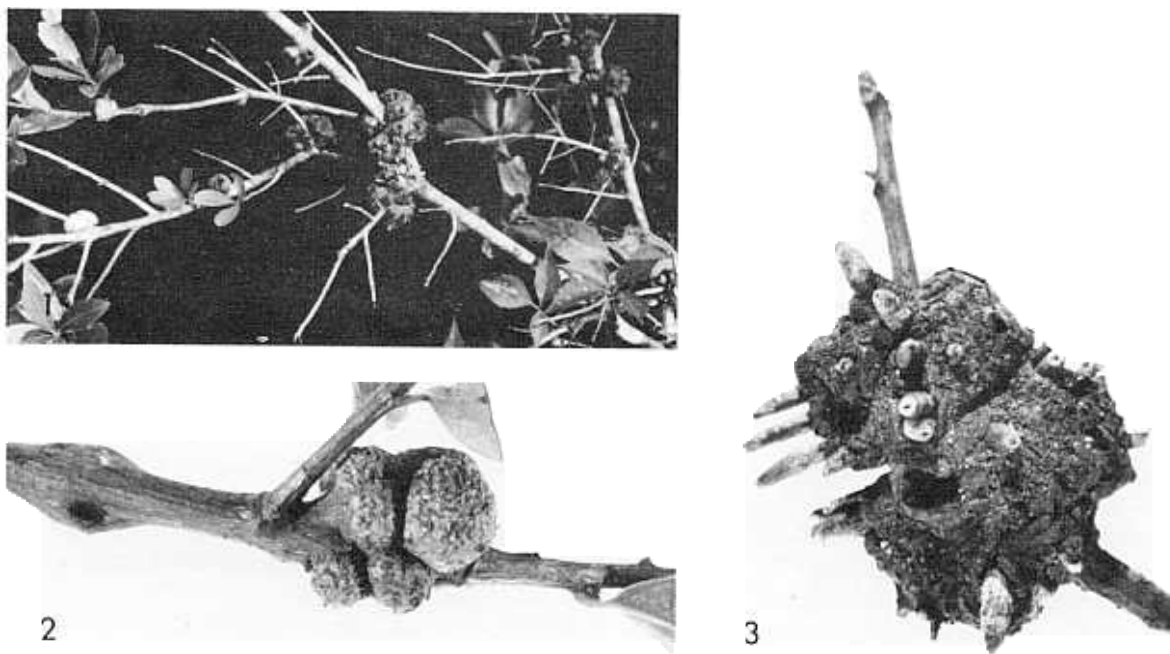


Spined or Horned Galls on Oaks in Florida Induced by Gall Wasps,
Callirhytis quercusclaviger (Ashmead) and *Callirhytis cornigera* (Osten Sacken)
(Hymenoptera: Cynipidae)¹

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INTRODUCTION: *Callirhytis quercusclaviger* (Ashmead) causes the "spine-bearing potato gall" on laurel oak, *Quercus laurifolia* Michx., in Florida (Ashmead 1881). The horned oak gall, caused by *Callirhytis cornigera* (Osten Sacken), occurs on water oak, *Quercus nigra* L., as well as several other *Quercus* spp. (Drooz 1985; Osten Sacken 1862). Generally, individual trees or small groups of trees become slightly to moderately infested by these *Callirhytis* spp. Widespread infestations are not common (Kinsey 1935). However, severe gall wasp infestations have been observed recently in several Florida counties. Extremely high numbers of twig galls of *C. quercusclaviger* have occurred on thousands of laurel oaks in several locations. These infestations have affected young to mature trees in woodlands and residential areas. The overabundance of twig galls has resulted in notable levels of branch dieback, crown thinning, and tree mortality.

IDENTIFICATION: Gall: (Figs. 1-3) Mature twig galls remain as individual swellings or form massive compound galls more than 5 cm in diameter and up to 20 cm long (Fig. 3)(Osten Sacken 1862; Taft and Bissing 1988). Young galls are slight, tumor-like swellings of periderm tissue. Bark color of young galls is a greenish-brown and bark surfaces are smooth except for protruding lenticels (Taft and Bissing 1988). If sufficiently mature, twig galls exhibit spines or horns. Older galls become very woody, discolored, and horns will be absent (Ashmead 1881). Galls are pathologically developed tissues. Cell hypertrophy (over-growth) and hyperplasia (cell proliferation) result in gall formation (Mani 1964). **Adult:** *C. quercusclaviger* - female body generally reddish-brown; abdomen much deeper than long, brownish-black on dorsum, ovipositor projecting at 45-degree angle; wings yellowish; ca. 2 mm long (Ashmead 1881). *C. cornigera* similar in appearance.



Figures 1-3. *Callirhytis quercusclaviger* (Ashmead). 1) Laurel oak branch with twig galls; 2) Young twig gall; 3) Mature twig gall with horns (Photo credit: Jeffrey W. Lotz).

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DISTRIBUTION: Specific records and observations from Alachua, Duval, Marion, Lake, Leon, Orange, Polk, Sumter, Suwannee, and Wakulla counties. It is likely both *Callirhytis* spp. occur throughout the ranges of their respective host oaks in Florida.

BIOLOGY: Little information is available for *C. quercusclaviger*. The apparent life cycle of *C. cornigera* is complicated. In New York, parthenogenic female wasps emerge from twig galls in May and June. These females oviposit eggs on veins on the underside of leaves. Small vein galls appear from late May through June. Male and female wasps emerge from the vein galls in early July. Mated females oviposit eggs in young oak twigs. Twig galls appear the following spring. Two or more years are required for the immature gall wasps to complete development in the twig galls. The galls provide shelter, protection, and food for the immature wasps (Hutchins 1969). Inside a gall, the larvae are surrounded by tissues (nutritive zone) rich in nutrients (Askew 1984). As the larvae reach maturity small spines or horns become evident on the gall. An adult wasp emerges from each horn (Johnson and Lyon 1976).

ECONOMIC IMPORTANCE: Twig galls can cause severe injury, loss of growth, and tree mortality (Johnson and Lyon 1976; Drooz 1985; Cummings 1976). The horned oak gall apparently becomes epidemic periodically in some areas and has killed thousands of pin oak, *Quercus palustris* Muench. (Taft and Bissing 1988). Twig galls result in disruption of the vascular tissues through the galled area. Normal transportation of photosynthates, water, and minerals becomes severely limited to and from leaves (Taft and Bissing 1988). In Florida, mature laurel oak trees in residential areas have succumbed to severe gall wasp infestations. Severe branch dieback and crown thinning are commonly observed on many laurel oaks.

SURVEY: Symptoms of infestation include branches exhibiting knotty, oval or spherical enlargements (galls) varying in size with horn-like projections. Galls may be present on all branches.

CONTROL: Control of these gall wasps is difficult. Prune infested branches where possible. Systemic insecticides may prove somewhat useful. In several large infestations recently investigated in Florida, the common variables were extremely high densities of laurel oak growing on sandy soils that are deeply drained, strongly acidic, and with low fertility (e.g., Alpin and Blanton soils). The high oak density apparently resulted from exclusion of fire--laurel oak is very susceptible to fire (Fowells 1965). Today, laurel oaks are often considered weeds due to their success in establishment and resulting densities. The stress of an ongoing, multi-year drought cycle may have exacerbated the effects of the galls on the trees.

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